Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Use of Spectrum Bands Above 24 GHz For Mobile Radio Services	)	GN Docket No. 14-177
	)	
Establishing a More Flexible Framework to Facilitate Satellite Operations in the 27.5-28.35 GHz and 37.5-40 GHz Bands	)	IB Docket No. 15-256
	)	
Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42-43.5 GHz Band	)	RM-11664
	)	
Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 To Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services	)	WT Docket No. 10-112
	)	
Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations	)	IB Docket No. 97-95

OPPOSITION TO PETITIONS FOR RECONSIDERATION

The Commission's decision to permit unlicensed operations in the 64-71 GHz band (subject to the technical standards in Part 15) promotes a range of consumer offerings. Microsoft applauds that decision and encourages the Commission not to disturb it. The Commission's flexible Part 15 rules have lowered the barriers to entry for innovators seeking to develop new

communications services and devices. Allocating an additional 7 GHz of high frequency spectrum for unlicensed Part 15 use under similar technical rules as the adjacent 57-64 GHz band will enable new unlicensed broadband applications requiring extremely high throughputs that are not possible using unlicensed mid-band spectrum or the spectrum available in the 57-64 GHz band alone and will thus promote the public interest. The Commission should reject the arguments in the Petitions for Reconsideration submitted by CTIA,[1] T-Mobile USA, Inc.,[2] and the Competitive Carriers Association,[3] ("CCA," and together with CTIA and T-Mobile, "Petitioners") since they fail to prove otherwise. Individually and collectively, Petitioners' arguments fall short of establishing that the public interest would be better served by reallocating all or part of the 64-71 GHz band for licensed services. Furthermore, Petitioners, unlike the Commission, fail to recognize the numerous benefits unlicensed use across the extended 57-71 GHz band will generate. Accordingly, the Commission should adhere to the decision it reached on this band in its July 2016 Order.[4]

I. PETITIONERS FAIL TO ESTABLISH THAT ALLOCATING 64-71 GHZ BAND FOR LICENSED SERVICES WOULD BETTER SERVE THE PUBLIC INTEREST.

Petitioners toss up a handful of ill-considered reasons the Commission should reconsider its allocation of the 64-71 GHz band to unlicensed use in the hope that something will stick. They contend that "contrary to the Commission's assertions, licensed use of the 66-71 GHz spectrum would occur in an expeditious fashion—and is further along than any potential use of

[1] Petition for Reconsideration of CTIA, GN Docket No. 14-177, IB Docket No. 15-256, RM-11664, WT Docket No. 10-112, IB Docket No. 97-95 ("CTIA Petition").
[2] T-Mobile USA, Inc. Petition for Reconsideration, GN Docket No. 14-177, IB Docket No. 15-256, RM-11664, WT Docket No. 10-112, IB Docket No. 97-95 ("T-Mobile Petition").
[3] Petition for Reconsideration of Competitive Carriers Association, GN Docket No. 14-177, IB Docket No. 15-256, RM-11664, WT Docket No. 10-112, IB Docket No. 97-95 ("CCA Petition").
[4] *See Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd. 8014, ¶ 130 (2016) ("Order").

the band for unlicensed operations"[5]; that the Commission did not provide a technical basis for its decision to allocate to date more unlicensed spectrum than licensed spectrum in the mmW band; and that recent studies indicate the band is also suitable for licensed use. All of these arguments fail to adequately demonstrate why the public interest would be better served if the Commission reconsidered its allocation of the band.

A. Unlicensed Use of the 64-71 GHz Band Is Poised To Accelerate.

CTIA argues that the sole basis for the Commission's decision is its allegedly speculative assertion that the 66-71 GHz band "would lay fallow if allocated and licensed for terrestrial mobile services" and that "the decision carries the inference that unlicensed uses will come to market before licensed solutions can be deployed."[6] This argument falls flat. First, there has not yet been agreement on the technical standards for 5G services. WRC-19 will determine whether the 66-76 GHz band will be identified for IMT-2020 (5G). No one can presume to know the outcome of the meeting several years in advance, especially before the sharing studies have been completed. In the interim, the 66-71 GHz band would lay fallow with respect to globally harmonized IMT-2020 devices. If in fact WRC-19 decided to identify the entire 66-76 GHz range or portion of it for IMT 2020, 5G compliant devices would only be available at some later time. Overall, there would be several years where the 64-71 GHz spectrum would lie fallow before it could be used by compliant IMT-2020 devices.

Second, the question of whether unlicensed devices will come on the market before 5G devices is irrelevant. Microsoft's experience is that the Commission regularly allocates spectrum or establishes technical and service rules where little or no development efforts have yet occurred. It is the Commission's actions that serve to drive investment and development.

[5] CTIA Petition at 21.
[6] CTIA Petition at 20.

Relatedly, CTIA claims the Commission provided no evidence for its conclusions that unlicensed devices could make use of the 64-71 GHz band in the "very near future" and that the Commission cites only standards efforts for the 57-64 GHz band, not actual product development and deployment.[7] It is unfortunate, but not surprising, that CTIA seemingly dismisses out-of-hand the importance of industry consensus standards as a critical building block in establishing a commercial ecosystem and ensuring that equipment and devices meeting industry consensus standards are interoperable. Microsoft is a member of organizations such as IEEE, the Wi-Fi Alliance™, and 3GPP and believes that standards and related matters such as certification testing play an important role in establishing successful commercial ecosystems. It is evident that CTIA's discussion of the near-term prospect of a licensed terrestrial mobile broadband device in the 64-71 GHz band relates to non-standard devices.

Assuming Petitioners are unaware, there are IEEE standards for a short range local area network and for a person area network operating in the 57-64 GHz band. The IEEE 802.11ad standard for local area networks was rolled up into P802.11-2016 and published in December 2016. The roll-up extended the existing 57-64 GHz channel plan to the 71 GHz channel. The proposed changes to the existing industry standard are meant to accommodate changes in the proposed commercial use cases enabled by the availability of having a contiguous 14 GHz spectrum block.

Even if there are industry standards for short range Part 15 devices operating across the extended 60 GHz band, a commercial ecosystem will be successful only if these compliant devices are interoperable. In October 2016, the Wi-Fi Alliance™, initiated a Wi-Fi Certified WiGig™ program that will provide the multi-vendor interoperability needed for the proliferation

[7] *See id.*

of 802.11ad compliant devices.[8] As industry experts have explained, Wi-Fi Alliance™ certification programs have "a strong history of accelerating broad technology adoption across the industry,"[9] meaning even more elements are in place now to expedite the deployment of unlicensed devices in this band than were in place when the Commission issued the Order.

CTIA further claims that only five products have been certified by the Wi-Fi Alliance™ for use in this band,[10] suggesting the band is not primed for unlicensed use. At best, this claim appears to be nothing more than CTIA's attempt at misdirection by equating the Wi-Fi Alliance™ certification program that began in late October 2016 with the number of relevant 60 GHz devices the FCC has certified. Microsoft has learned through the Wi-Fi Alliance™ that the number of FCC certified devices is well over 100. And, contrary to CTIA's claims, production of devices for unlicensed use in this band is well underway. ABI Research predicts that 180 million WiGig chipsets for the smartphone market will ship in 2017 and that smartphone chipsets will make up *almost half* of the 1.5 billion total WiGig market shipments in 2021.[11] More fundamentally, CTIA's argument ignores the ease by which an existing Part 15 short range device operating between 57 and 64 GHz can be made to operate across the entire 57-71 GHz band.

B. The Commission's Allocation of the 64-71 GHz Band for Unlicensed Use Is Appropriate and Reasonable.

[8] *See* James Atkinson, *Wi-Fi Alliance unveils certification for 802.11ad Wi-Fi equipment*, Wireless, (Oct. 25, 2016, 5:27 PM), http://www.wireless-mag.com/News/43439/wi-fi-alliance-unveils-certification-for-80211ad-wi-fi-equipment.aspx.
[9] *See* Kelly Hill, *Wi-Fi Alliance launches WiGig certification*, RCRWirelessNews (Oct. 25, 2016), http://www.rcrwireless.com/20161025/test-and-measurement/wigig-certification-gets-underway-tag6.
[10] *See* CTIA Petition at 20.
[11] *See* Hill, *supra* note 9.

The second argument on which CTIA relies is that the Commission should reconsider its reservation of the entire 64-71 GHz band for unlicensed operations because, although the Commission notes that the concept of "gigahertz parity" is not appropriate in this context, the Commission fails to provide a technical basis for the spectrum disparity between licensed and unlicensed uses.[12] Setting aside the point that CTIA disproportionately devotes a relatively large amount of discussion to a relatively minor element of the Order, CTIA ignores the fundamental administrative law principle of deference to an agency's expert judgment.[13] Specifically, CTIA criticizes the Commission for failing to provide a "reasoned explanation" for its decision that gigahertz parity should not apply in the 64-71 GHz band and instead "simply making a declaratory statement, with no basis or engineering support for that statement."[14] This claim is unfounded. The Commission does provide such reasoned explanation required by the Administrative Procedure Act: the Report and Order explains that spectrum characteristics vary at different frequencies due to different propagation losses and other atmospheric and sharing conditions and that "[a] strict linear comparison per frequency unit of spectrum amount in different frequency bands…is not a valid comparison."[15] That explanation provides ample basis for the Commission's conclusion. It is a statement of fact.

CTIA's underlying argument that the Commission drew the wrong lines when deciding that the so-called "gigahertz parity" should not apply in the 64-71 GHz band ultimately fails

[12] *See* CTIA Petition at 21–22.
[13] *See Nat'l Cable & Telecomms. v. Brand X Internet Servs.*, 545 U.S. 967, 980, (2005)*; Chevron U.S.A., Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837 (1984); *Skidmore v. Swift & Co.*, 323 U.S. 134 (1944).
[14] CTIA Petition at 22.
[15] Order at ¶ 130.

because the Commission has "wide discretion in its administrative line-drawing."[16] The Commission's rationale neither constitutes a departure from previous policies[17] nor requires ignoring technical data in the record.[18] Accordingly, the Commission's decision here is both reasonable and entitled to deference.[19]

Asking for the same thing in a different way, Petitioners also call for the Commission to reconsider its allocation of 64-71 GHz to unlicensed use because of the relatively smaller share of spectrum allocated to licensed uses in the Order. CTIA contends that the Commission should consider providing a "more equitable distribution of spectrum."[20] CCA contends that the Commission "allocated far less 5G spectrum than expected for exclusively licensed use" and that the Commission's policies "would make available almost twice the amount of unlicensed spectrum as licensed spectrum in the mmW bands." These arguments are unpersuasive because they fail to account for the total amount of spectrum the Commission is proposing to allocate for licensed fixed or mobile use in the *Further Notice of Proposed Rulemaking*. Specifically, the Commission is considering allocating 24.25-24.45 GHz together with 24.75-25.25 GHz, 31.8-33 GHz, 42-42.5 GHz, 47.2-50.2 GHz, and 50.4-52.6 GHz spectrum bands for licensed fixed and

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[16] *See Covad Commc'ns Co. v. FCC*, 450 F.3d 528, 541 (D.C. Cir. 2006) (internal quotation marks omitted). *See also Cassell v. FCC*, 154 F.3d 478, 485 (D.C. Cir. 1998) (D.C. Circuit was "unwilling to review line-drawing performed by the Commission unless a petitioner can demonstrate that lines drawn ... are patently unreasonable, having no relationship to the underlying regulatory problem").

[17] *See AT&T Corp. v. FCC*, 236 F.3d 729, 736 (D.C. Cir. 2001) *citing Committee for Community Access v. FCC*, 737 F.2d 74, 77 (D.C. Cir. 1984) (the Commission "cannot silently depart from previous policies or ignore precedent").

[18] *See Am. Radio Relay League, Inc. v. FCC*, 524 F.3d 227, 241 (D.C. Cir. 2008) (partially remanding Commission order that "offered no reasoned explanation for its dismissal of empirical data that was submitted at its invitation").

[19] *FERC v. Elec. Power Supply Ass'n*, 136 S. Ct. 760, 782, 193 L. Ed. 2d 661 (2016), as revised (Jan. 28, 2016); *Southwestern Bell Tel. Co. v. FCC*, 168 F.3d 1344, 1352 (D.C. Cir. 1999).

[20] CTIA Petition at 19.

mobile use.[21] The *Further Notice* represents at least an additional 7.6 GHz for exclusive licensed use.[22] In this context, allocating seven gigahertz for unlicensed use at 64-71 GHz does not register as inequitable.

C. The Commission Made a Regulatory Decision Regarding Use of the 64-71 GHz.

Finally, T-Mobile and CCA make more general claims that the Commission should reconsider allocating 64-71 GHz to unlicensed use essentially because the band is also suitable for licensed use. T-Mobile contends that "the 64-71 GHz band has value for licensed mobile services and could lead to even greater 5G investment and innovation."[23] Likewise, CCA claims that "[e]ven very high mmW spectrum has potential for licensed mobile use"[24] Microsoft agrees the spectrum band is suitable for mobile use. Indeed, many of the unlicensed devices incorporating 64-71 GHz radio will be portable.

After weighing the facts, however, the Commission decided that it is in the public interest for devices to operate under a Part 15 regulatory framework in the 64-71 GHz band rather than under a licensing regime. Along these lines, one could make the argument that the 28 GHz, 37 GHz, and 39 GHz bands are equally suitable for Part 15 mobile use. And in fact, Microsoft did make such an argument in its Comments with respect to the 28 GHz band specifically and use-or-share across the 37-40 GHz range. The Commission disagreed.

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[21] *See* Order at ¶5.
[22] It is uncertain what the Commission intends to do with the 10 GHz of spectrum in the 70 / 80 GHz band (71-76 GHz and 81-86 GHz).
[23] T-Mobile Petition at 8 (citing studies demonstrating mobile use in the band).
[24] CAA Petition at 8. *See also* 5G Americas Petition for Reconsideration, GN Docket No. 14-177, IB Docket No. 15-256, RM-11664, WT Docket No. 10-112, IB Docket No. 97-95, at 4 ("Out of almost 11 GHz of spectrum identified in the NPRM, the *Report and Order* makes less than 4 GHz of that spectrum available for licensed use, despite the fact that commenters raised concerns that a balance of licensed and unlicensed use was important.").

Importantly, the issue at hand for the Commission is not simply whether the band was suitable for licensed use; the issue is how to allocate the band to best promote the public interest. None of T-Mobile's or CCA's broad arguments comes close to explaining why the public interest would be better served if the band were allocated to licensed use. As a result, these arguments offer no basis for the Commission to reconsider the allocation.

II. ALLOCATING 64-71 GHZ BAND FOR LICENSED SERVICES WILL PROVIDE SUBSTANTIAL PUBLIC INTEREST BENEFITS.

The Commission should adhere to its decision to permit unlicensed operations in the 64-71 GHz band, subject to the technical standards in Section 15.255 of its rules because allowing unlicensed operations in this band would significantly advance the public interest. Both the existing record and additional evidence underscore this point.

First, notwithstanding Petitioners' claims to the contrary,[25] the Commission fully considered the record in this proceeding which overwhelmingly supports its decision to allocate the 64-71 GHz band to unlicensed use. The Commission reviewed comments from a wide range of commenters, including T-Mobile, Intel, WISPA, the Wi-Fi Alliance™, Information Technology Industry Council, Open Technology Institute and Public Knowledge, and Fixed Wireless Communications Coalition, Inc.[26] Based on this review, the Commission determined, among other things, that making available additional spectrum contiguous to the existing 57-64 GHz band may enable higher throughputs and enhanced use of present spectrum and may permit an increase in the number of simultaneous high-bandwidth users.[27] The Commission also determined that it should not leave five gigahertz of spectrum to lie fallow when unlicensed

[25] *See e.g.*, CTIA Petition at 3.
[26] *See* Order at ¶¶ 130–132.
[27] *See id.* at ¶ 130.

applications are ready in the very near future.[28] The Commission thus identified and relied on the most important reasons why allocating the 64-71 GHz band to unlicensed use advances the public interest.

Additional evidence also demonstrates that unlicensed spectrum holds tremendous promise for promoting economic growth, which further reinforces why the Commission's decision should remain unaltered. Current estimates suggest that the aggregate economic value of unlicensed spectrum in the United States totals $140.20 billion.[29] Estimates also suggest that by 2017, unlicensed spectrum will have contributed at least $547.22 billion in economic surplus annually and $49.78 billion to the annual GDP.[30] As explained in a Telecom Advisory Services report, unlicensed spectrum can generate value across four, interrelated dimensions: (i) complementing wireline and cellular technologies, thereby enhancing their effectiveness; (ii) providing an environment conducive to the development of alternative technologies, thus expanding consumer choice; (iii) enabling the launch of innovative business models; and (iv) expanding access to communications services beyond what is economically optimal by technologies operating in licensed bands.[31] Allocation of the 64-71 GHz for Part 15 use will help ensure that these economic benefits can continue to materialize and advance the public interest.

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[28] *See id.*

[29] *See* Final Report: Assessment of the Economic Value of Unlicensed Spectrum in the United States, Telecom Advisory Services, LLC (Feb. 2014), at 6, *available at* http://www.wififorward.org/wp-content/uploads/2014/01/Value-of-Unlicensed-Spectrum-to-the-US-Economy-Full-Report.pdf ("TAS February 2014 Report").

[30] Assessment of the Future Economic Value of Unlicensed Spectrum in the United States, Telecom Advisory Services (Aug. 2014), at 4, *available at* http://www.wififorward.org/wp-content/uploads/2014/01/Katz-Future-Value-Unlicensed-Spectrum-final-version-1.pdf.

[31] *See* TAS February 2014 Report at 6.

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Because no argument Petitioners advance provides a convincing reason why the Commission should reverse its decision to reallocate the 64-71 GHz band to licensed use, and because both evidence in the record as well as additional evidence underscore that unlicensed use of the band will yield significant public interest benefits, the Commission should deny the Petitions to Reconsider.

Respectfully submitted,

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